

## Tribal Minor Source Registration - Region 8

July, 2019

U.S. EPA Region 8 Federal Minor NSR Permit Coordinator,

The pertinent information for the attached Region 8 minor source registration form and emissions inventory is below.

**Facility Name:** FD Federal 9-23-6-19

**County:** Uintah

**Owner/Operator:** Finley Resources Inc.

**Contact:** Josh Morgan

**Phone:** 817-231-8756

**Email:** JMorgan@finleyresources.com

**Mailing Address:** 1308 Lake St.

Fort Worth TX 76102

**Prepared by:** Green Mountain Consulting, Ltd.

**Mailing Address:** 3649 Evergreen Parkway #1011, Evergreen, CO 80437

**Phone:** (405)439-3173

**Email:** [lan@GreenMountainLtd.com](mailto:lan@GreenMountainLtd.com)

The purposes for this submission is to register the oil and gas production facility listed above. This facility is located on Uintah and Ouray Reservation Tribal Lands.

The information was obtained from verbal and written information provided by the facility representatives. The following emissions inventory has been prepared per EPA recommendations and industry standards for emissions calculations.

Please contact Ian Green with any questions regarding this documentation.

Respectfully,

**Ian Green**

Managing Partner, Environmental Engineer

Email: [lan@GreenMountainLtd.com](mailto:lan@GreenMountainLtd.com)

Cell: [\(405\)439-3173](tel:(405)439-3173)



**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN  
COUNTRY  
40 CFR 49.151**

**Registration for Existing Sources  
(FORM REG)**

**Use of this information request form is voluntary and not yet approved by the Office of Management and Budget.** The following is a check list of the type of information that Region 8 will use to process information on your registration. While submittal of this form is not required, it does offer details on the information we will use to complete your registration and providing the information requested will help build an existing source emissions inventory. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

**Please submit information to following two entities:**

Federal Minor NSR Permit Coordinator  
U.S. EPA, Region 8  
1595 Wynkoop Street, 8P-AR  
Denver, CO 80202-1129  
[R8airpermitting@epa.gov](mailto:R8airpermitting@epa.gov)

For more information, visit:  
<http://www.epa.gov/caa-permitting/tribal-nsr-permitting-region-8>

The Tribal Environmental Contact for the specific reservation:

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact:

[R8airpermitting@epa.gov](mailto:R8airpermitting@epa.gov)

**A. GENERAL SOURCE INFORMATION**

1. (a) <b>Company Name</b> (Who owns this facility?) <b>Finley Resources, Inc.</b>		2. <b>Facility Name</b> FD Federal 9-23-6-19	
(b) <b>Operator Name</b> (Is the company that operates this facility different than the company that owns this facility? What is the name of the company?)			
3. Type of Operation <b>Oil and gas Production</b>		4. Portable Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No 5. Temporary Source? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
6. NAICS Code <b>211111</b>		7. SIC Code <b>1311</b>	
8. Physical Address (Or, home base for portable sources)			
9. Reservation* <b>Uintah and Ouray</b>	10. County* <b>Uintah</b>	11a. Latitude (decimal format)* 40.28127	11b. Longitude (decimal format)* -109.7433
12a. Quarter Quarter Section* <b>NE ¼ of SE ¼</b>	12b. Section* 23	12c. Township* 6S	12d. Range* 19E

\* Provide all locations of operation for portable sources

**B. CONTACT INFORMATION**

<b>Company Contact</b> (Who is the <u>primary</u> contact for the company that owns this facility?) Josh Morgan		Title Regulatory Analyst
Mailing Address 1308 Lake St. Fort Worth TX 76102		
Email Address JMorgan@finleyresources.com		
Telephone Number 817-231-8756	Facsimile Number	
<b>Operator Contact</b> (Is the company that operates this facility different than the company that owns this facility? Who is the <u>primary</u> contact for the company that operates this source?)		Title
Mailing Address		
Email Address		
Telephone Number	Facsimile Number	
<b>Permitting Contact</b> (Who is the person primarily responsible for Clean Air Act permitting for the company? We are seeking one main contact for the company. Please do not list consultants.) Josh Morgan		Title Regulatory Analyst
Mailing Address 1308 Lake St. Fort Worth TX 76102		
Email Address JMorgan@finleyresources.com		
Telephone Number 817-231-8756	Facsimile Number	
<b>Compliance Contact</b> (Is the person responsible for Clean Air Act compliance for this company different than the person responsible for Clean Air Act permitting? Who is the person <u>primarily</u> responsible for Clean Air Act compliance for the company? We are seeking one main contact for the company. Please do not list consultants.) <b>Ian Green</b>		Title Environmental Engineer
Mailing Address 3649 Evergreen Parkway, Unit 1011, Evergreen, CO 80439		
Email Address Ian@GreenMountainLtd.com		
Telephone Number 405-439-3173	Facsimile Number	

**C. ATTACHMENTS****Include all of the following information as attachments to this form**

☒ Narrative description of the operations

☒ Identification and description of all emission units and air pollution generating activities (with the exception of the exempt emissions units and activities listed in §49.153(c))

☒ Identification and description of any existing air pollution control equipment and compliance monitoring devices or activities

☒ Type and amount of each fuel used

☒ Type raw materials used

☒ Production Rates

☒ Operating Schedules

☒ Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated NSR pollutants at your source.

☒ Total allowable (potential to emit if there are no legally and practically enforceable restrictions) emissions from the air pollution source for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

☒ Estimates of the total actual emissions from the air pollution source for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides (SO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.

☐ Other

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

**D. TABLE OF ESTIMATED EMISSIONS**

The following estimates of the total emissions in tons/year for all pollutants contained in your worksheet stated above should be provided.

<b>Pollutant</b>	<b>Total Actual Emissions (tpy)</b>	<b>Total Allowable or Potential Emissions (TPY)</b>	
<b>PM</b>	<b>0.237</b>	<b>0.237</b>	PM - Particulate Matter PM <sub>10</sub> - Particulate Matter less than 10 microns in size PM <sub>2.5</sub> - Particulate Matter less than 2.5 microns in size SO <sub>2</sub> - Sulfur Oxides NO <sub>x</sub> - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds Fluorides - Gaseous and particulates H <sub>2</sub> SO <sub>4</sub> - Sulfuric Acid Mist H <sub>2</sub> S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
<b>PM<sub>10</sub></b>	<b>0.237</b>	<b>0.237</b>	
<b>PM<sub>2.5</sub></b>	<b>0.219</b>	<b>0.219</b>	
<b>SO<sub>2</sub></b>	<b>0.008</b>	<b>0.008</b>	
<b>NO<sub>x</sub></b>	<b>3.690</b>	<b>3.690</b>	
<b>CO</b>	<b>2.695</b>	<b>2.695</b>	
<b>VOC</b>	<b>6.186</b>	<b>6.186</b>	
<b>Pb</b>	<b>0.000</b>	<b>0.000</b>	
<b>Fluorides</b>	<b>0.000</b>	<b>0.000</b>	
<b>H<sub>2</sub>SO<sub>4</sub></b>	<b>0.000</b>	<b>0.000</b>	
<b>H<sub>2</sub>S</b>	<b>0.000</b>	<b>0.000</b>	
<b>TRS</b>	<b>0.000</b>	<b>0.000</b>	
<b>RSC</b>	<b>0.000</b>	<b>0.000</b>	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>(a) Coal cleaning plants (with thermal dryers);</li> <li>(b) Kraft pulp mills;</li> <li>(c) Portland cement plants;</li> <li>(d) Primary zinc smelters;</li> <li>(e) Iron and steel mills;</li> <li>(f) Primary aluminum ore reduction plants;</li> <li>(g) Primary copper smelters;</li> <li>(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;</li> <li>(i) Hydrofluoric, sulfuric, or nitric acid plants;</li> <li>(j) Petroleum refineries;</li> <li>(k) Lime plants;</li> <li>(l) Phosphate rock processing plants;</li> <li>(m) Coke oven batteries;</li> <li>(n) Sulfur recovery plants;</li> <li>(o) Carbon black plants (furnace process);</li> <li>(p) Primary lead smelters;</li> <li>(q) Fuel conversion plants;</li> </ul> | <ul style="list-style-type: none"> <li>(r) Sintering plants;</li> <li>(s) Secondary metal production plants;</li> <li>(t) Chemical process plants</li> <li>(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;</li> <li>(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;</li> <li>(w) Taconite ore processing plants;</li> <li>(x) Glass fiber processing plants;</li> <li>(y) Charcoal production plants;</li> <li>(z) Fossil fuel-fired steam electric plants of more than 250 million British thermal units per hour heat input, and</li> <li>(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.</li> </ul> |
|--|--|

## Instructions

Please answer all questions. If the item does not apply to the source and its operations write "n/a". If the answer is not known write "unknown".

### A. General Source Information

1. Company Name & Operator Name (if the operator of the facility is different than the owner, please provide this information): Provide the complete company and operator names. For corporations, include divisions or subsidiary names, if any.
2. Facility Name: Provide the facility name. Please note that a facility is a site, place, location, etc... that may contain one or more air pollution emitting units.
3. Type of Operation: Indicate the generally accepted name for the operation (i.e., asphalt plant, gas station, dry cleaner, sand & gravel mining, oil and gas wellsite, tank battery, etc.).
4. Portable Source: Will this facility operate in more than one location? Some examples of portable sources include asphalt batch plants and concrete batch plants.
5. Temporary Source: A temporary source, in general, would have emissions that are expected last less than 12 months.
6. NAICS Code: North American Industry Classification System. The NAICS Code for your facility can be found at the following link → [North American Industry Classification System](http://www.census.gov/epcd/naics/nsic2ndx.htm#S1) (<http://www.census.gov/epcd/naics/nsic2ndx.htm#S1>).
7. SIC Code: Standard Industrial Classification Code. Although the new North American Industry Classification System (NAICS) has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your facility can be found at the following link → [Standard Industrial Classification Code](http://www.osha.gov/pls/imis/sic_manual.html) ([http://www.osha.gov/pls/imis/sic\\_manual.html](http://www.osha.gov/pls/imis/sic_manual.html)).
8. Physical Address: Provide the actual address of where you are proposing to construct the new facility, not the mailing address. Include the State and the ZIP Code.
9. Reservation: Provide the name of the Indian reservation within which the facility will be constructed.
10. County: Provide the County within which the source will be constructed.
- 11a & 11b. Latitude & Longitude: These are GPS (global positioning system) coordinates.
- 12a – 12d. Section-Township-Range: Please provide these coordinates in 1/4 Section/Section/Township/Range. (e.g., SW ¼, NE ¼ S36/T10N/R21E).

**B. Contact Information**

Please provide the information, requested, in full.

1. Company Contact: Provide the full name of the primary contact for the company that owns the facility.
2. Operator Contact: Provide the name of the primary contact for the company that operates the facility if the company operating the facility is different from the company that owns the facility.
3. Permitting Contact: Provide the name of primary contact, for permitting decisions, at the company that owns the facility or the company that operates the facility.
4. Compliance Contact: Provide the name of primary contact, responsible for compliance of the facility, at the company that owns the facility or the company that operates the facility. If this is the same as the Permitting Contact please note this on the form.

**C. Attachments**

The information requested in the attachments will enable EPA to understand the type of source being registered and the nature and extent of the air pollutants being emitted.

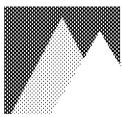
**D. Total Emissions**

1. Allowable Emissions (See also, Potential to Emit): Emissions rate of a source calculated using the maximum rated capacity of the source (unless the source is subject to practically and legally enforceable limits which restrict the operating rate, or hours of operation, or both) and the most stringent of the following:
  - a) Any applicable standards as set forth in 40 CFR parts 60 and 61;
  - b) Any applicable Tribal or Federal Implementation Plan emissions limitation, including those with a future compliance date; or
  - c) Any emissions rate specified as a federally enforceable permit condition, including those with a future compliance date.
2. Potential to Emit: The maximum capacity of a source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable as a practical matter. See Allowable Emissions.
3. Actual Emissions: Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. For a source that operated during the entire calendar year preceding the initial registration submittal, the reported actual emissions typically should be the annual emissions for the preceding calendar year, calculated using the actual

operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted during the preceding calendar year. However, if you believe that the actual emissions in the preceding calendar year are not representative of the emissions that your source will actually emit in coming years, you may submit an estimate of projected actual emissions along with the actual emissions from the preceding calendar year and the rationale for the projected actual emissions. For a source that has not operated for an entire year, the actual emissions are the estimated annual emissions for the current calendar year.

4. The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources:
  - (i) Source-specific emission tests;
  - (ii) Mass balance calculations;
  - (iii) Published, verifiable emission factors that are applicable to the source. (i.e., manufacturer specifications).
  - (iv) Other engineering calculations; or
  - (v) Other procedures to estimate emissions specifically approved by the Reviewing Authority.
5. Guidance for estimating emissions can be found at <http://www.epa.gov/ttn/chief/efpac/index.html>.





## Utah Emissions Inventory

April 2019

Josh Morgan,

The pertinent information for the attached emissions inventory is below.

**Facility Name:** FD Federal 9-23-6-19

**County:** Uintah

**Owner/Operator:** Finley Resources Inc.

**Mailing Address:** 1308 Lake St.

Fort Worth TX 76102

**Prepared by:** Green Mountain Consulting, Ltd.

**Mailing Address:** 3649 Evergreen Parkway #1011, Evergreen, CO 80437

**Phone:** (405)439-3174

**Email:** [Caitlin@GreenMountainLtd.com](mailto:Caitlin@GreenMountainLtd.com)

The purposes for this emissions inventory are to calculate total emissions, determine all applicable state and federal regulations, and identify the appropriate air authorization for FD Federal 9-23-6-19.

The information was obtained from verbal and written information provided by the facility representatives. The following emissions inventory has been prepared per EPA recommendations and industry standards for emissions calculations.

Please contact Caitlin Green with any questions regarding this documentation.

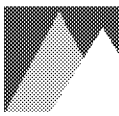
Respectfully,

**Caitlin Green**

Managing Partner, Compliance Specialist

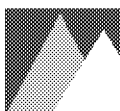
Email: [Caitlin@GreenMountainLtd.com](mailto:Caitlin@GreenMountainLtd.com)

Cell: [\(405\)439-3174](tel:(405)439-3174)



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## Application Summary

### Project Description

FD Federal 9-23-6-19 is an oil and gas production site located in Uintah County, Utah.

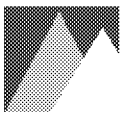
#### *Pertinent Facility Information*

Facility Information	
Facility Name	FD Federal 9-23-6-19
GPS Coordinates	40.28127, -109.7433
County	Uintah
Average Daily Oil Production (bbl/day)	17.6
Average Daily Water Production (bbl/day)	7
Average Daily Gas Production (MCF/Day)	6
H2S Content of Gas (ppm)	0
Control Equipment Onsite	Yes
Site Specific or Representative Sample	Representative
Emissions Summary	
Actual Facility Wide Emissions - VOC C3+ (tpy)	3.39
Uncontrolled, Potential Facility Wide Emissions - VOC C3+ (tpy)	6.19
Facility Wide Emissions - Actual GHG (mtpy CO <sub>2</sub> e)	2048.39
Facility Wide Emissions - Actual Total HAPs (tpy)	0.75

**This facility is a Minor HAP source.**

**This facility is a Minor VOC source.**

FD Federal 9-23-6-19 is located on and Ouray Reservation (UOR) tribal lands. The UOR air quality control and enforcement is under the jurisdiction of the EPA. The facility wide emissions exceed the minor source thresholds for non-attainment areas as promulgated in Table 1 to 40 CFR 49.153. Therefore, this facility is subject to the existing source registration requirements under 40 CFR 49.160. Registration should be completed using EPA Form No. 5900-247 (OMB Control Number: 2060-0003).



## Facility Information

### Process Description

FD Federal 9-23-6-19 is an oil and gas production site located in Uintah County, Utah. According to the Green Book published by the EPA, Uintah is a non-attainment area.

Fluid is pumped from one wellhead to the primary containment area. The fluid is transferred through 1 heated separation vessel to separate gas, oil, and water. Emissions from the heater treater are a result of combustion. The emission point is HT1. The fluid is then transferred through 1 separator. Separators are closed vessels and not emission points.

There is a 100 hp engine onsite used to power a generator. The generator powers the electric pump jack motor. The emission point is ENG1.

The oil is routed to 3 storage tanks. These storage tanks are set up in parallel therefore it is assumed that the oil is equally routed to each of the tanks. The oil storage tank emissions points are OIL1-OIL3. The produced water is routed to a storage tank. The produced water storage tank is emission point PW1. All storage tanks have 13.5'x20' dimensions. Working and breathing losses occur in the stock tanks. Additionally, flash emissions occur from the depressurization event from the separator to the atmospheric stock tanks. Each storage tank has a tank heater; emission points TH1-TH4.

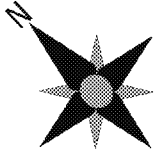
The oil and produced water are routinely trucked from the site. The emissions points from trucking are TR-O and TR-PW.

The produced gas is routed and sold via a sales meter.

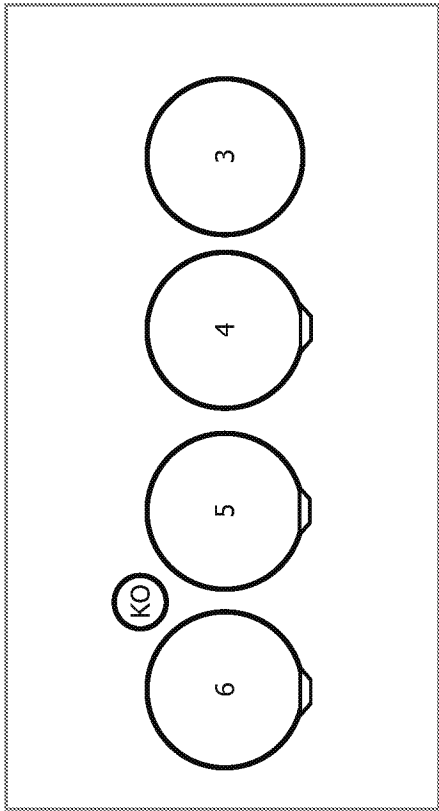
The tanks are manifolded together and the recovered vapors are routed to a flare with a 98% destruction efficiency.

### Driving Directions

Depart Gusher, UT on 40 E and continue for 2.4 miles, turn right. Continue on road for 3 miles into facility.



#	Type
1	SEP
2	HT
3	PW
4	OIL
5	OIL
6	OIL



WH

ENGINE &  
GENERATOR

Propane



CB

\*discovered leaks identified in yellow boxes

Green Mountain Consulting, Ltd.

Drawn By: Ian Green

Date Drawn: April, 2019

Notes: Not Drawn to Scale

Finley Resources, Inc.

Facility: FD Fed 9-23D-6-19

GPS: 40.03368, -109.6654

Uintah County, UT

Legend

	- Flow Meter	PW	- Produced Water	BD	- Blow Down
	- Containment	SCR	- Scrubber		Auxiliary Tank
	- Tank Heater	KO	- Knockout	FLR	- Flare
	- Walking Path	WH	- Wellhead	CB	- Combustor
	- Heater Treater	HT	- Heater Treater	COMP	- Compressor



## Emissions Calculations

### Calculation Methodology

All calculations were performed using industry standard calculation methodologies. A detailed explanation of each calculation is provided below. Any assumptions are intended to be conservative and are discussed in the appropriate section.

#### Oil Tanks

Oil tanks have three major sources of emissions: working losses, breathing losses, and flash losses. E&P TANKS v2011 was used to calculate the emissions associated with the onsite oil storage tanks.

Attachment 2 provides a copy of the E&P TANKS report. Oil and gas lab work from a representative site, UTE 13-13A-4-1, was used to run E&P TANKS and is provided with a justification in Attachment 1.

There are 3 oil storage tanks on site. Oil is routed to the storage tanks in approximately equal quantities. One E&P tank run was completed and is used to calculate emissions from the 3 storage tanks of equal dimensions and throughput. The emissions from the storage tanks are controlled by a flare with a 98% destruction efficiency.

The oil storage tank emissions are provided in the table below.

*Oil Tank Emission Rates (per tank)*

		PER TANK UNCONTROLLED EMISSIONS (TPY)	TOTAL UNCONTROLLED EMISSIONS (TPY)
Regulated Air Pollutants	C1+	1.406	4.218
	VOC	0.955	2.865
	NOx	0.000	0.000
	CO	0.000	0.000
	SOx	0.000	0.000
	TSP	0.000	0.000
	PM10	0.000	0.000
	PM2.5	0.000	0.000
	H2S	0.000	0.000
	Benzene	0.002	0.006
HAPs	Toluene	0.003	0.009
	Ethylbenzene	0.000	0.000
	Xylene	0.002	0.006
	n-Hexane	0.224	0.672
GHGs	Formaldehyde	0.000	0.000
	CO2	0.012	0.036
	CH4	0.310	0.930
	N2O	0.000	0.000



### Produced Water Tanks

Produced water tanks have three major sources of emissions: working losses, breathing losses, and flash losses. E&P TANKS v2011 was used to calculate the emissions associated with the on site produced water storage tanks. Attachment 2 provides a copy of the E&P TANKS report. Oil and gas lab work from a representative site, UTE 13-13A-4-1, was used to run E&P TANKS and is provided with a justification in Attachment 1.

Since E&P TANKS does not allow for direct produced water tank calculations, the produced water throughput rate was treated as an oil throughput rate. The resulting emission estimates are then reduced by 95% to account for the assumed water to oil ratio of 0.95:0.05. The 95% reduction is per the Texas Commission on Environmental Quality (TCEQ) guidance document – “Determining Emissions from Produced Water Storage Tanks” - UT-DEQ has not published specific reduction factors for produced water tanks.

There is 1 produced water tank on site. The emissions from the storage tanks are controlled by a flare with a 98% destruction efficiency.

#### Produced Water Tank Emission Rates

	POLLUTANT	TOTAL UNCONTROLLED EMISSIONS (TPY)
Regulated Air Pollutants	C1+	0.077
	VOC	0.052
	NOx	0.000
	CO	0.000
	SOx	0.000
	TSP	0.000
	PM10	0.000
	PM2.5	0.000
	H2S	0.000
	Benzene	0.000
HAPs	Toluene	0.000
	Ethylbenzene	0.000
	Xylene	0.000
	n-Hexane	0.012
	Formaldehyde	0.000
GHGs	CO2	0.001
	CH4	0.017
	N2O	0.000

### Fugitives

Fugitive emissions are a result of equipment leaks and occur in the oil stream, the produced water stream, and the gas stream. The calculations were completed using the EPA guidance document “1995

Protocol for Equipment Leak Emission Estimates “, document ID: EPA 453/R-95-017. The component count assumptions are based on the guidance provided in 40 CFR 98 Subpart W tables W-1B and W-1C. The emission factors are used per EPA 453/R-95-017.

#### Facility-Wide Component Counts

COMPONENT	NUMBER
Number of Valves	21
Number of Flanges	0
Number of Connectors	36
Number of Open-Ended Lines	36
Number of Other	0
Number of Seals	3

The facility wide components comprise of the sum of the oil, produced water, and gas streams. For the purposes of these calculations it is assumed each of the streams have the same number of components except for seals. All seals are in the gas stream.

#### Fugitive Emission Rates

		OIL FUGITIVE EMISSIONS (TPY)	PW FUGITIVE EMISSIONS (TPY)	GAS FUGITIVE EMISSIONS (TPY)	TOTAL FUGITIVE EMISSIONS (TPY)
Regulated Air Pollutants	C1+	0.427	0.238	0.702	1.367
	VOC	0.278	0.155	0.458	0.891
	NOx	0.000	0.000	0.000	0.000
	CO	0.000	0.000	0.000	0.000
	SOx	0.000	0.000	0.000	0.000
	TSP	0.000	0.000	0.000	0.000
	PM10	0.000	0.000	0.000	0.000
	PM2.5	0.000	0.000	0.000	0.000
	H2S	0.000	0.000	0.000	0.000
	Benzene	0.039	0.022	0.064	0.124
HAPs	Toluene	0.001	0.000	0.001	0.002
	Ethylbenzene	0.001	0.001	0.002	0.004
	Xylene	0.009	0.005	0.014	0.028
	n-Hexane	0.037	0.020	0.060	0.118
	Formaldehyde	0.000	0.000	0.000	0.000
GHGs	CO2	0.004	0.002	0.006	0.011
	CH4	0.202	0.112	0.331	0.645
	N2O	0.000	0.000	0.000	0.000

#### Tank Truck Loading

Tank truck loading of both oil and produced water causes emissions losses. Both oil and produced water are transferred via trucks. All emissions associated with tank truck loading were calculated using EPA's guidance document AP-42 Chapter 5 - Petroleum Industry.



**Trucking Emission Rates**

	POLLUTANT	OIL TRUCKING EMISSIONS (TPY)	PW TRUCKING EMISSIONS (TPY)	TOTAL TRUCKING EMISSIONS (TPY)
Regulated Air Pollutants	C1+	0.536	0.010	0.546
	VOC	0.349	0.006	0.356
	NOx	0.000	0.000	0.000
	CO	0.000	0.000	0.000
	SOx	0.000	0.000	0.000
	TSP	0.000	0.000	0.000
	PM10	0.000	0.000	0.000
	PM2.5	0.000	0.000	0.000
	H2S	0.000	0.000	0.000
	Benzene	0.049	0.001	0.049
HAPs	Toluene	0.001	0.000	0.001
	Ethylbenzene	0.002	0.000	0.002
	Xylene	0.011	0.000	0.011
	n-Hexane	0.046	0.001	0.047
	Formaldehyde	0.000	0.000	0.000
GHGs	CO2	0.005	0.000	0.005
	CH4	0.069	0.001	0.070
	N2O	0.000	0.000	0.000

**Heater Emissions**

Heaters emit greenhouse gasses (GHGs) and hazardous air pollutants (HAPs) as a result of the combustion process. Emissions of NO<sub>x</sub>, CO, GHGs, HAPs, and VOCs were calculated using the EPA's guidance document AP-42 Chapter 1 - External Combustion Sources. Xylene and Ethylbenzene emissions were calculated using emission factors published by the Air Pollution Control District in Ventura County California. To ensure conservative calculations, it is assumed that the heaters run 8760 hours per year.

At this facility there is 1 heater treater with a heater rating of 0.5 MMBTU/hr.

*Heater Treater Emission Rates*

	POLLUTANT	EMISSION RATE (TPY)
Regulated Air Pollutants	C1+	0.016
	VOC	0.010
	NOx	0.191
	CO	0.160
	SOx	0.001
	TSP	0.025
	PM10	0.014
	PM2.5	0.011
	H2S	0.000
	Benzene	0.000
HAPs	Toluene	0.000
	Ethylbenzene	0.000
	Xylene	0.000
	n-Hexane	0.003
	Formaldehyde	0.000
GHGs	CO2	228.820
	CH4	0.004
	N2O	0.004

At this facility there are 4 tank heaters with a heater rating of 0.5 MMBTU/hr.



**Tank Heater Emission Rates**

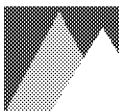
	POLLUTANT	PER UNIT EMISSION RATE (TPY)	TOTAL EMISSION RATE (TPY)
Regulated Air Pollutants	C1+	0.016	0.064
	VOC	0.010	0.042
	NOx	0.191	0.763
	CO	0.160	0.641
	SOx	0.001	0.005
	TSP	0.025	0.101
	PM10	0.014	0.058
	PM2.5	0.011	0.043
	H2S	0.000	0.000
	Benzene	0.000	0.000
HAPs	Toluene	0.000	0.000
	Ethylbenzene	0.000	0.000
	Xylene	0.000	0.000
	n-Hexane	0.003	0.014
	Formaldehyde	0.000	0.001
GHGs	CO2	228.820	915.280
	CH4	0.004	0.018
	N2O	0.004	0.017

*Pneumatic Devices and Pumps*

The facility has 1 pneumatic pump and 1 pneumatic device. Emission calculations were completed using the Western United States emission factors from Table W-1A from 40 CFR Part 98, Subpart W.

*Pneumatic Pump and Device Emission Rates*

	POLLUTANT	PNEUMATIC DEVICES EMISSION RATE (TPY)	PNEUMATIC PUMP EMISSION RATE (TPY)	TOTAL EMISSION RATE (TPY)
Regulated Air Pollutants	C1+	2.961	2.918	5.879
	VOC	0.462	0.455	0.918
	NOx	0.000	0.000	0.000
	CO	0.000	0.000	0.000
	SOx	0.000	0.000	0.000
	TSP	0.000	0.000	0.000
	PM10	0.000	0.000	0.000
	PM2.5	0.000	0.000	0.000
	H2S	0.000	0.000	0.000
	Benzene	0.001	0.001	0.002
HAPs	Toluene	0.001	0.001	0.002
	Ethylbenzene	0.000	0.000	0.000
	Xylene	0.001	0.001	0.001
	n-Hexane	0.000	0.000	0.000
	Formaldehyde	0.000	0.000	0.000
GHGs	CO2	0.038	0.037	0.075
	CH4	2.144	2.112	4.256
	N2O	0.000	0.000	0.000



### Internal Combustion Engines

There is one 40 hp Ajax E-565 engine onsite. The emissions associated with this engine are shown below.

Engine Emission Rates		
	POLLUTANT	ENGINE EMISSION RATE (TPY)
Regulated Air Pollutants	C1+	1.616
	VOC	1.053
	NOx	2.737
	CO	1.895
	SOx	0.003
	TSP	0.330
	PM10	0.165
	PM2.5	0.165
	H2S	0.000
	Benzene	0.008
HAPs	Toluene	0.004
	Ethylbenzene	0.000
	Xylene	0.001
	n-Hexane	0.002
	Formaldehyde	0.316
GHGs	CO2	815.712
	CH4	6.230
	N2O	0.000

### Glycol Dehydrator Emissions

There are no glycol dehydrators at this facility, therefore no emissions to report.

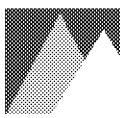


### Flare Emissions

Flare emissions resulting from combustion are calculated using emission factors published in AP-42, Chapter 13 – Miscellaneous Sources. The destruction efficiency of 98% is justified in the following section. Tank vapors routed to the flare that are not destroyed are also emitted from the flare and are shown in the below table.

*Flare Emission Rates*

	POLLUTANT	FLARE EMISSION RATE (TPY)
Regulated Air Pollutants	C1+	0.060
	VOC	0.060
	NOx	0.006
	CO	0.028
	SOx	0.000
	TSP	0.001
	PM10	0.001
	PM2.5	0.001
	H2S	0.000
	Benzene	0.000
HAPs	Toluene	0.000
	Ethylbenzene	0.000
	Xylene	0.000
	n-Hexane	0.000
	Formaldehyde	0.000
GHGs	CO2	10.653
	CH4	0.000
	N2O	0.000



## Emissions Summary

Summary table for VOC, GHG, and HAP emissions are provided below.

### Summary - VOC Emissions

	VOC Emissions Potential - Uncontrolled (tpy)	VOC Emissions Potential - Controlled (tpy)
Oil Tanks	2.865	0.057
PW Tanks	0.052	0.001
Fugitives	0.891	0.891
Trucking	0.356	0.356
Heater Treaters	0.010	0.010
Tank Heaters	0.042	0.042
Pneumatics	0.918	0.918
Engines	1.053	1.053
Flares	0.060	0.060
<b>Total</b>	<b>6.246</b>	<b>3.387</b>

### Summary -GHG Emissions

	CO <sub>2</sub> (TPY)	METHANE (TPY)	N <sub>2</sub> O (TPY)	GHG EMISSIONS POTENTIAL (MTPY)	GHG EMISSIONS POTENTIAL (MTPY CO <sub>2</sub> e)
Oil Tanks	0.036	0.019	0.000	0.050	0.455
PW Tanks	0.001	0.000	0.000	0.001	0.008
Fugitives	0.011	0.645	0.000	0.595	14.636
Trucking	0.005	0.070	0.000	0.069	1.598
Heater Treaters	228.820	0.004	0.004	207.590	208.816
Tank Heaters	915.280	0.018	0.017	830.360	835.264
Pneumatics	0.075	4.256	0.000	3.929	96.587
Engines	815.712	6.230	0.000	745.655	881.304
Flares	10.653	0.000	0.000	9.665	9.722
<b>Total</b>	<b>1,970.594</b>	<b>11.242</b>	<b>0.021</b>	<b>1,797.913</b>	<b>2,048.389</b>

### Summary -HAP Emissions

HAZARDOUS AIR POLLUTANT	Benzene (lb/yr)	Toluene (lb/yr)	Ethylbenzene (lb/yr)	Xylene (lb/yr)	n-Hexane (lb/yr)	Formaldehyde (lb/yr)
Oil Tanks	0.240	0.360	0.000	0.240	26.880	0.000
PW Tanks	0.006	0.006	0.000	0.004	0.482	0.000
Fugitives	247.885	3.886	7.752	55.276	235.303	0.000
Trucking	98.921	1.551	3.093	22.058	93.900	0.000
Heater Treaters	0.008	0.013	0.041	0.117	6.865	0.286
Tank Heaters	0.032	0.052	0.000	0.000	27.458	1.144
Pneumatics	3.577	3.825	0.259	2.915	0.000	0.000
Engines	16.672	8.276	0.928	2.303	3.824	631.519
Flares	0.000	0.001	0.002	0.005	0.320	0.013
<b>Total</b>	<b>367.341</b>	<b>17.968</b>	<b>12.075</b>	<b>82.919</b>	<b>395.031</b>	<b>632.963</b>
Maximum Single HAP	Formaldehyde	<b>632.963</b>	(lb/yr)	=	<b>0.316</b>	(tpy)
<b>Total HAP</b>	<b>1508.297</b>	(lb/yr)		=	<b>0.754</b>	(tpy)

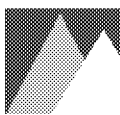


## Regulatory Applicability

### Federal Rule Applicability

FEDERAL REGULATIONS CITATION	TITLE	APPLICABLE	JUSTIFICATION
40 CFR 50	NAAQS	No	Emission limits are met.
NSPS 40 CFR 60, Subpart A	General Provisions	No	No NSPS requirements are applicable to this facility.
NSPS 40 CFR 60, Subpart Ka	Standards of Performance for <b>Storage Vessels for Petroleum Liquids</b> for which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and <b>Prior</b> to July 23, 1984	No	Storage vessels were constructed after 7-23-84.
NSPS 40 CFR 60, Subpart Kb	Standards of Performance for <b>Volatile Organic Liquid Storage Vessels</b> (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced <b>After</b> July 23, 1984	No	60.110b(d)(4) exemption applies. The vessels are less than 1589.874 m3 and store petroleum prior to the custody transfer.
NSPS 40 CFR 60.330 Subpart GG	<b>Stationary Gas Turbines</b>	No	No gas turbines on site.
NSPS 40 CFR 60, Subpart KKK	Leaks of VOC from <b>Onshore Gas Plants</b>	No	Not a gas processing plant.
NSPS 40 CFR Part 60 Subpart LLL	Standards of Performance for <b>Onshore Natural Gas Processing</b> : SO <sub>2</sub> Emissions	No	Not a gas processing plant.
NSPS 40 CFR Part 60 Subpart OOOO	Standards of Performance for Crude Oil and Natural Gas Production, Transmission, and Distribution	No	The storage tanks uncontrolled potential to emit is less than 6tpy therefore this rule is not applicable.
NSPS 40 CFR Part 60 Subpart OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015	Yes	40 CFR Part 60, Subpart OOOOa is applicable to the facility since the facility was constructed on 5/11/2018, which is after 9/18/2015.





FEDERAL REGULATIONS CITATION	TITLE	APPLICABLE	JUSTIFICATION
NSPS 40 CFR Part 60 Subpart JJJJ	Standards of Performance for Stationary Spark Ignition Internal Combustion Engines	No	No internal combustion engines on site.
NSPS 40 CFR Part 60 Subpart Dc	Heaters between 10-100 MMBTU/hr	No	Heater onsite has a rating below 10 MMBTU/hr.
NESHAP 40 CFR 61 Subpart A	General Provisions	No	No applicable regulations under 40 CFR 61.
MACT 40 CFR 63, Subpart A	General Provisions	No	No applicable regulations under 40 CFR 63.
MACT 40 CFR 63.760 Subpart HH	Oil and Natural Gas Production Facilities	No	Facility is an area source and has no glycol dehydrators on site; therefore, this subpart is not applicable.
MACT 40 CFR 63 Subpart HHH	National Emission Standards for Hazardous Air Pollutants From Natural Gas Transmission and Storage Facilities	No	Facility is not a natural gas transmission and storage facility that transport or store natural gas prior to entering the pipeline to a local distribution company or to a final end user.
MACT 40 CFR 63 Subpart ZZZZ	National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines (RICE MACT)	No	No internal combustion engines on site.
NESHAP 40 CFR 64	Compliance Assurance Monitoring	No	Facility is not a major source.
40 CFR 49 Subpart C	Federal Minor New Source Review Program in Indian Country	Yes	Emissions are above registration thresholds per Table 1 to CFR 49.153. See detailed explanation below.
40 CFR 49.160	Registration Program for Minor Sources in Indian Country	Yes	Facility must register using the existing source registration form. EPA Form 5900-247.



### *Federal Minor New Source Review Program in Indian Country*

Emissions calculations indicate that FD Federal 9-23-6-19 is subject to the registration requirements in 40 CFR Part 49. The below table shows the minor NSR thresholds as promulgated in Table 1 to 40 CFR 49.153 as well as the facility emission rates.

POLLUTANT	TABLE 1 to 40 CFR 49.153 - MINOR NSR NON-ATTAINMENT AREA THRESHOLD (TYP)	EMISSION RATE (TPY)	DOES THE FACILITY EXCEED MINOR NSR THRESHOLDS?
VOC (C3+)	2	6.246	Yes
CO	5	2.695	No
NOx	5	3.690	No
SOx	5	0.008	No
PM-10	1	0.237	No
PM-2.5	0.6	0.219	No
H2S	N/A	0.003	No

### **State Rule Applicability**

The facility exists on the Uintah and Ouray Reservation, under federal-EPA jurisdiction. As a result, the facility is subject to applicable federal requirements and is not regulated by the UDEQ.

### **Regulatory Review Summary**

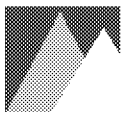
After the completion of the regulatory review, it has been determined that FD Federal 9-23-6-19 is required to be registered with the EPA. The facility emits VOCs in quantities greater than the minor NSR thresholds listed in Table 1 to 40 CFR 49.153. The facility must register using the existing registration form (EPA Form 5900-247) to comply with the registration requirements in 40 CFR 49.160.

#### *Federal Regulations*

Facility must register using EPA Form 5900-247 to comply with 40 CFR 49.160.

#### *State Regulations*

The facility exists on Indian country lands and is subject to EPA regulation. Therefore, this facility does not have any state imposed requirements.



## Attachment 1: Gas and Liquid Lab Analyses

### Oil and Gas Representative Sample

A representative sample from UTE 13-13A-4-1 is being utilized for this emissions inventory for FD Federal 9-23-6-19. The representative analysis criteria published by the TCEQ was used as guidance because UT-DEQ has not published representative analysis criteria. It is not economically feasible to sample every site in the region; therefore representative samples will be used by the company.

The primary formation was determined according to the Contiguous United States AAPG-CSD Geologic Provinces Code Map.

	LEASE USING SAMPLE AS REPRESENTATIVE	LEASE WHERE SAMPLE WAS OBTAINED
Facility Name	FD Federal 9-23-6-19	UTE 13-13A-4-1
County	Uintah	Uintah
Primary Formation	Uinta Basin	Uinta Basin
API Gravity of Sales Oil	40	30.5
Separating Vessel(s)	heater treater	heater treater
Temperature (°F)	160	114
Pressure (psig)	30	70
Date of Sample	-	11/15/2016

Both facilities process the streams in a similar manner. At both sites, liquid is pumped from a wellhead to a separating vessel. The oil, produced water, and gas are separated. The oil and produced water are stored in stock tanks. The gas is sold at a sales meter.

### EXTENDED NATURAL GAS LIQUID ANALYSIS

#### SAMPLE DATA

PROJECT NO.....	LGMT6151	SAMPLE ID.....	Pressurized Liquid
COMPANY NAME.....	Green Mountain Ltd	ANALYSIS DATE.....	11/18/2016
SITE.....	Ute 13-13A 4-1	SAMPLE DATE.....	11/15/2016
UNIT ID.....	Heater Treater	CYLINDER NO.....	37527
SAMPLED BY.....	DW	LAB ANALYST.....	CB

#### FIELD DATA

SAMPLE PRESSURE.....	70 psig	SAMPLE TEMP.....	114 F
AMBIENT PRESSURE.....	12.3 psi	AMBIENT TEMP.....	54 F

COMMENTS: Separator Gauge Readings: 68 psig; 140 F. Probe Pressure: 69.4-69.8 psig. IR Gun Surface Temperature: 114-115 F.

#### LABORATORY DATA

COMPONENT	MOLE %	WT%	LV%
CARBON DIOXIDE.....	0.0295	0.0057	0.0061
NITROGEN (AIR).....	0.0832	0.0107	0.0106
METHANE.....	1.6770	0.1193	0.3465
ETHANE.....	0.7863	0.1048	0.2562
PROPANE.....	1.5828	0.3094	0.5314
ISOBUTANE.....	0.5166	0.1331	0.2060
N-BUTANE.....	1.3831	0.3564	0.5314
ISOPENTANE.....	0.9920	0.3173	0.4421
N-PENTANE.....	1.2239	0.3915	0.5406
CYCLOPENTANE.....	0.1172	0.0364	0.0423
N-HEXANE.....	10.7324	4.1003	5.3782
CYCLOHEXANE.....	0.5548	0.2070	0.2300
OTHER HEXANES.....	7.3832	2.7924	3.4753
OTHER HEPTANES.....	2.7184	1.1995	1.4717
METHYLCYCLOHEXANE.....	1.0503	0.4572	0.5142
2,2,4 TRIMETHYLPENTANE.....	0.0756	0.0383	0.0463
BENZENE.....	0.1667	0.0577	0.0568
TOLUENE.....	0.4436	0.1812	0.1809
ETHYLBENZENE.....	0.1345	0.0633	0.0632
XYLENES.....	0.8724	0.4106	0.4105
OTHER OCTANES.....	3.9901	2.0044	2.3751
NONANES.....	3.3124	1.8814	2.1986
DECANES PLUS.....	60.1740	84.8219	80.6859
<b>TOTAL</b>	<b>100.00000</b>	<b>100.00000</b>	<b>100.00000</b>

#### SAMPLE FRACTIONS

	TOTAL	C6+	C10+
SPG LIQUID.....	0.87	0.88	0.91
API GRAVITY.....	31.1	29.2	23.2
MOLECULAR WEIGHT.....	225.6	241.8	318.0
ABSOLUTE DENSITY (lbs/gal).....	7.3	7.3	7.6
HEATING VALUE LIQUID IDL GAS (GBTU/gal).....	58612.7	128265.0	131605.5
GBTU/GAL LIQUID.....	127832.2	128987.0	130622.4
NBTU/GAL LIQUID.....	140155.9	141067.5	145507.3
VAPOR/LIQUID (SCF/gal).....	16.2	15.6	14.1
VAPOR PRESSURE (psia).....	96.1	1.2	0.0

ANALYTICAL PROCEDURES TAKEN FROM GPA-2186, ASTM D6730-01(2011), ASTM D7169.



**AIR  
POLLUTION  
TESTING, INC.**  
DENVER, SALT LAKE CITY

5530 Marshall Street  
Arvada, Colorado 80002  
Phone: 303-420-5949  
Fax: 303-420-5920

**EXTENDED NATURAL GAS LIQUID ANALYSIS**  
**DHA COMPONENT ANALYSIS**

**SAMPLE DATA**

PROJECT NO..... LGMT6151  
COMPANY NAME..... Green Mountain Ltd  
SITE..... Ute 13-13A 4-1  
UNIT ID..... Heater Treater  
SAMPLED BY..... DW

SAMPLE ID..... Pressurized Liquid  
ANALYSIS DATE..... 11/18/2016  
SAMPLE DATE..... 11/15/2016  
CYLINDER NO..... 37527  
LAB ANALYST..... CB

**FIELD DATA**

SAMPLE PRESSURE..... 70 psig  
AMBIENT PRESSURE..... 12.3 psi

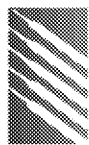
SAMPLE TEMP..... 114 F  
AMBIENT TEMP..... 54 F

COMMENTS: Separator Gauge Readings: 68 psig; 140 F. Probe Pressure: 69.4-69.8 psig. IR Gun Surface Temperature: 114-115 F.

**LABORATORY DATA**

COMPONENT	MOLE %	WT%	LV%
Air	0.0832	0.0107	0.0106
Carbon dioxide	0.0295	0.0057	0.0061
Methane	1.6770	0.1193	0.3465
Ethane	0.7863	0.1048	0.2562
Propane	1.5828	0.3094	0.5314
Isobutane	0.5166	0.1331	0.2060
n-Butane	1.3831	0.3564	0.5314
Cyclopentane	0.1172	0.0364	0.0423
Isopentane	0.9920	0.3173	0.4421
n-Pentane	1.2239	0.3915	0.5406
Unknown C5s	0.0000	0.0000	0.0000
Neopentane	0.0000	0.0000	0.0000
Benzene	0.1667	0.0577	0.0568
Methylcyclopentane	3.1667	1.1815	1.3648
Cyclohexane	0.5548	0.2070	0.2300
2,2-Dimethylbutane	0.0194	0.0074	0.0099
Neohexane	0.0000	0.0000	0.0000
2-Methylpentane	1.7002	0.6496	0.8593
2,3-Dimethylbutane	0.1489	0.0569	0.0743
3-Methylpentane	2.3480	0.8971	1.1670
Unknown C6s	0.0000	0.0000	0.0000
n-Hexane	10.7324	4.1003	5.3782
Toluene	0.4436	0.1812	0.1809
1,1-Dimethylcyclopentane	0.0829	0.0361	0.0414
1,t-3-Dimethylcyclopentane	0.2153	0.0937	0.1083
1,c-3-Dimethylcyclopentane	0.1908	0.0831	0.0964
1,t-2-Dimethylcyclopentane	0.3174	0.1381	0.1591
Methylcyclohexane	1.0503	0.4572	0.5142
1,c-2-Dimethylcyclopentane	0.0000	0.0000	0.0000
Ethylcyclopentane	0.0970	0.0422	0.0477
Cycloheptane	0.0000	0.0000	0.0000
2,2-Dimethylpentane	0.0136	0.0060	0.0078
2,4-Dimethylpentane	0.0000	0.0000	0.0000
2,2,3-Trimethylbutane	0.0000	0.0000	0.0000
3,3-Dimethylpentane	0.0161	0.0072	0.0089
2-Methylhexane	0.2475	0.1099	0.1400
2,3-Dimethylpentane	0.1334	0.0592	0.0737
3-Methylhexane	0.3634	0.1614	0.2032
3-Ethylpentane	0.0000	0.0000	0.0000
n-Heptane	1.0409	0.4624	0.5852
Triptane	0.0000	0.0000	0.0000
Unknown C7s	0.0000	0.0000	0.0000

Styrene	0.0000	0.0000	0.0000
Ethylbenzene	0.1345	0.0633	0.0632
o-Xylene	0.1770	0.0833	0.0820
m-Xylene	0.3902	0.1837	0.1840
p-Xylene	0.3052	0.1437	0.1445
1,1,3-Trimethylcyclopentane	0.0000	0.0000	0.0000
1,t-2,c-4-Trimethylcyclopentane	0.1330	0.0662	0.0766
1,t-2,c-3-Trimethylcyclopentane	0.1733	0.0862	0.0990
1,c-3-Dimethylcyclohexane	0.0163	0.0081	0.0092
1,t-4-Dimethylcyclohexane	0.1347	0.0670	0.0761
1,1-Dimethylcyclohexane	0.0653	0.0325	0.0360
1-Methyl-c-3-ethylcyclopentane	0.0399	0.0199	0.0223
1-Methyl-t-2-ethylcyclopentane	0.0000	0.0000	0.0000
1,1,2-Trimethylcyclopentane	0.1014	0.0505	0.0565
1,c-2,t-4-Trimethylcyclopentane	0.0000	0.0000	0.0000
1,c-2,t-3-Trimethylcyclopentane	0.4450	0.2214	0.2487
1-Methyl-1-3-ethylcyclopentane	0.0325	0.0162	0.0183
1-Methyl-1-ethylcyclopentane	0.1187	0.0591	0.0655
1,t-3-Dimethylcyclohexane	0.0000	0.0000	0.0000
1,c-4-Dimethylcyclohexane	0.0000	0.0000	0.0000
1,c-2,c-3-Trimethylcyclopentane	0.2122	0.1055	0.1173
Isopropylcyclopentane	0.0319	0.0159	0.0177
1-Ethyl-c-2-methylcyclopentane	0.0000	0.0000	0.0000
1,c-2-Dimethylcyclohexane	0.0000	0.0000	0.0000
n-Propylcyclopentane	0.2734	0.1360	0.1517
Ethylcyclohexane	0.0336	0.0167	0.0184
Cyclooctane	0.0000	0.0000	0.0000
n-Octane	1.0578	0.5357	0.6604
Unknown C8s	0.0000	0.0000	0.0000
Diisobutyl	0.0000	0.0000	0.0000
Isooctane	0.0000	0.0000	0.0000
2,2,4-Trimethylpentane	0.0756	0.0383	0.0463
2,2-Dimethylhexane	0.1552	0.0786	0.0977
2,4-Dimethylhexane	0.0358	0.0181	0.0224
2,5-Dimethylhexane	0.0000	0.0000	0.0000
2,2,3-Trimethylpentane	0.0000	0.0000	0.0000
3,3-Dimethylhexane	0.0000	0.0000	0.0000
2,3,4-Trimethylpentane	0.0081	0.0041	0.0049
2,3-Dimethylhexane	0.0320	0.0162	0.0197
2-Methylheptane	0.6030	0.3054	0.3785
4-Methylheptane	0.1587	0.0804	0.0987
3-Methylheptane	0.1281	0.0649	0.0795
3,4-Dimethylhexane	0.0000	0.0000	0.0000
3-Ethylhexane	0.0000	0.0000	0.0000
C9	3.3124	1.8814	2.1986
C10	3.6019	2.2720	2.6940
C11	2.6409	1.8301	2.1407
C12	2.0577	1.5539	1.7963
C13	2.9283	2.3934	2.5244
C14	2.4924	2.1921	2.2817
C15	2.3209	2.1857	2.2588
C16	1.5313	1.5373	1.5757
C17	1.8395	1.9610	2.0194
C18	1.9287	2.1761	2.2330
C19	1.9381	2.3072	2.3399
C20	1.6938	2.1217	2.1394
C21	1.1232	1.4767	1.4804
C22	1.7314	2.3842	2.3764
C23	1.1855	1.7061	1.6928
C24	1.2857	1.9303	1.9066
C25	1.3642	2.1330	2.0972
C26	1.1025	1.7924	1.7544
C27	1.5331	2.5877	2.5216
C28	1.1849	2.0737	2.0116
C29	1.1827	2.1434	2.0723
C30+	23.5072	44.0638	38.7693
TOTAL	100.0000	100.0000	100.0000



**AIR  
POLLUTION  
TESTING, INC.**  
DENVER, SALT LAKE CITY

5530 Marshall Street  
Arvada, Colorado 80002  
Phone: 303-420-5949  
Fax: 303-420-5920

**EXTENDED NATURAL GAS LIQUIDS ANALYSIS**  
**BY CARBON NUMBER**

**SAMPLE DATA**

PROJECT NO..... LGMT6151  
COMPANY NAME..... Green Mountain Ltd  
SITE..... Ute 13-13A 4-1  
UNIT ID..... Heater Treater  
SAMPLED BY..... DW

SAMPLE ID..... Pressurized Liquid  
ANALYSIS DATE..... 11/18/2016  
SAMPLE DATE..... 11/15/2016  
CYLINDER NO..... 37527  
LAB ANALYST..... CB

**FIELD DATA**

SAMPLE PRESSURE..... 70 psig  
AMBIENT PRESSURE..... 12.3 psi

SAMPLE TEMP..... 114 F  
AMBIENT TEMP..... 54 F

COMMENTS: Separator Gauge Readings: 68 psig; 140 F. Probe Pressure: 69.4-69.8 psig. IR Gun Surface Temperature: 114-115 F.

**LABORATORY DATA**

COMPONENT	MOLE %	WT%	LV%
Air	0.0832	0.0107	0.0106
Carbon dioxide	0.0295	0.0057	0.0061
C1	1.6770	0.1193	0.3465
C2	0.7863	0.1048	0.2562
C3	1.5828	0.3094	0.5314
C4	1.8997	0.4895	0.7374
C5	2.3332	0.7452	1.0251
C6	18.8371	7.1574	9.1403
C7	4.2123	1.8379	2.1669
C8	5.0726	2.5167	2.8951
C9	3.3124	1.8814	2.1986
C10	3.6019	2.2720	2.6940
C11	2.6409	1.8301	2.1407
C12	2.0577	1.5539	1.7963
C13	2.9283	2.3934	2.5244
C14	2.4924	2.1921	2.2817
C15	2.3209	2.1857	2.2588
C16	1.5313	1.5373	1.5757
C17	1.8395	1.9610	2.0194
C18	1.9287	2.1761	2.2330
C19	1.9381	2.3072	2.3399
C20	1.6938	2.1217	2.1394
C21	1.1232	1.4767	1.4804
C22	1.7314	2.3842	2.3764
C23	1.1855	1.7061	1.6928
C24	1.2857	1.9303	1.9066
C25	1.3642	2.1330	2.0972
C26	1.1025	1.7924	1.7544
C27	1.5331	2.5877	2.5216
C28	1.1849	2.0737	2.0116
C29	1.1827	2.1434	2.0723
C30+	23.5072	44.0638	38.7693
TOTAL	100.0000	100.0000	100.0000

The following files were used in generating this report:

C:\Resultfiles1\DHA\_2\_37527\_161118114052.xml  
C:\Chem32\2\DATA\DHA\37527\_11202016\_0402.csv  
C:\AscentSimdis\Output\Ute\_11202016.csv



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DENVER, SALT LAKE CITY

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Arvada, Colorado 80002  
Phone: 303-420-5949  
Fax: 303-420-5920

**PHYSICAL PROPERTY TESTING**

**SAMPLE DATA**

PROJECT NO..... LGMT6151  
COMPANY NAME..... Green Mountain Ltd  
SITE..... Ute 13-13A 4-1  
UNIT ID..... Tank #3  
SAMPLED BY..... DW

SAMPLE ID..... Sales Oil  
ANALYSIS DATE..... 11/18/2016  
SAMPLE DATE..... 11/15/2016  
CYLINDER NO..... Jar  
LAB ANALYST..... CB

**FIELD DATA**

SAMPLE PRESSURE..... Ambient  
AMBIENT PRESSURE..... 12.3 psi

SAMPLE TEMP..... 123 F  
AMBIENT TEMP..... 54 F

COMMENTS:

**LABORATORY DATA**

API GRAVITY = 30.5

REID VAPOR PRESSURE = 3.5 psi

**NOTES:** API GRAVITY MEASURED USING ASTM D1298/D287

VAPOR PRESSURE MEASURED USING ASTM D6377/6378





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Fax: 303-420-5920

**EXTENDED GAS ANALYSIS**

**SAMPLE DATA**

PROJECT NO..... LGMT6151  
COMPANY NAME..... Green Mountain  
SITE..... Ute 13-13A 4-1  
UNIT ID..... Ute 13-13A 4-1  
SAMPLED BY..... DW

SAMPLE ID..... Sales Gas  
ANALYSIS DATE..... 11/18/2016  
SAMPLE DATE..... 11/15/2016  
CYLINDER NO..... GV-12  
LAB ANALYST..... CB

**FIELD DATA**

SAMPLE PRESSURE..... 60 psi  
AMBIENT PRESSURE..... 12.3 psi

SAMPLE TEMP..... 81 F  
AMBIENT TEMP..... 54 F

COMMENTS: **H<sub>2</sub>S = 18 ppm\***

\*ASTM Method D4810 Length of Stain

**LABORATORY DATA**

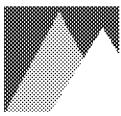
COMPONENT	MOLE %	WT%	GPM
HYDROGEN SULFIDE.....	0.0000	0.0000	0.0000
CARBON DIOXIDE.....	0.5596	1.2720	0.0955
NITROGEN.....	0.5154	0.7457	0.0567
METHANE.....	86.8071	71.9299	14.7225
ETHANE.....	6.3882	9.9216	1.7091
PROPANE.....	3.3206	7.5631	0.9152
ISOBUTANE.....	0.5029	1.5098	0.1646
N-BUTANE.....	0.8761	2.6301	0.2763
ISOPENTANE.....	0.2709	1.0097	0.0991
N-PENTANE.....	0.2514	0.9368	0.0912
CYCLOPENTANE.....	0.0228	0.0827	0.0068
N-HEXANE.....	0.0769	0.3422	0.0316
CYCLOHEXANE.....	0.0168	0.0729	0.0057
OTHER HEXANES.....	0.1386	0.6171	0.0570
HEPTANES.....	0.0811	0.4199	0.0375
METHYLCYCLOHEXANE.....	0.0183	0.0929	0.0074
2,2,4 TRIMETHYLPENTANE.....	0.0072	0.0427	0.0036
BENZENE.....	0.0075	0.0302	0.0021
TOLUENE.....	0.0068	0.0322	0.0023
ETHYLBENZENE.....	0.0004	0.0022	0.0002
XYLENES.....	0.0045	0.0249	0.0018
C8+ HEAVIES.....	0.1034	0.6828	0.0581
SUBTOTAL	99.9766	99.9614	18.3443
OXYGEN/ARGON	0.0234	0.0386	0.0021
<b>TOTAL</b>	<b>100</b>	<b>100</b>	<b>18.3464</b>

**BTU @**

MOLECULAR WEIGHT.....	19.3606	NET DRY REAL	1055.8844 /scf
RELATIVE DENSITY (AIR=1).....	0.6685		
COMPRESSIBILITY FACTOR.....	0.9970	GROSS DRY REAL	1168.4676 /scf
		GROSS WET REAL	1148.5006 /scf

ANALYTICAL PROCEDURES TAKEN FROM GPA 2286-95

ED\_004016P\_00013275-00033



## Attachment 2: E&P Tanks Reports

\*\*\*\*\*

\* Project Setup Information \*

\*\*\*\*\*

Project File : G:\My Drive\Green Mountain Consulting Ltd\Production\Finley -102618 - New Drill PBRs\Tribal  
 Flowsheet Selection : Oil Tank with Separator  
 Calculation Method : AP42  
 Control Efficiency : 0.00%  
 Known Separator Stream : Low Pressure Oil  
 Entering Air Composition : No  
 Component Group : C10+

Well ID : FD Federal 9-23-6-19 - Oil Tank  
 Date : 2019.04.25

\*\*\*\*\*

\* Data Input \*

\*\*\*\*\*

Separator Pressure (psia) : 44.70  
 Separator Temperature (F) : 160.0  
 C10+ SG : 0.91  
 C10+ MW(lb/lbmol) : 318.00

-- Low Pressure Oil -----

No.	Component	Mole%	Wt%
1	H2S	0.0018	0.0003
2	O2	0.0000	0.0000
3	CO2	0.0295	0.0058
4	N2	0.0832	0.0103
5	C1	1.6770	0.1192
6	C2	0.7863	0.1048
7	C3	1.5828	0.3094
8	i-C4	0.5166	0.1331
9	n-C4	1.3831	0.3563
10	i-C5	0.9920	0.3173
11	n-C5	1.3411	0.4289
12	C6	8.9882	3.4328
13	C7	2.7184	1.2074
14	C8	3.9900	2.0203
15	C9	3.3123	1.8835
16	C10+	60.1728	84.8198
17	Benzene	0.1667	0.0577
18	Toluene	0.4436	0.1812
19	E-Benzene	0.1345	0.0633
20	Xylenes	0.8724	0.4106
21	n-C6	10.7322	4.0998
22	224Trimethylp	0.0756	0.0383

-- Sales Oil -----

Production Rate (bbl/day) : 5.90  
 Days of Annual Operation : 365  
 API Gravity : 30.50  
 Reid Vapor Pressure (psia) : 3.50  
 Bulk Temperature : 150.0

-- Tank and Shell Data -----

Diameter (ft) : 15.50  
 Shell Height (ft) : 16.00  
 Cone Roof Slope : 0.06  
 Average Liquid Height (ft) : 15.00  
 Vent Pressure Range (psia) : 0.06  
 Solar Absorbance : 0.54

-- Meteorological Data -----

City : Salt Lake City, UT

Min Ambient Temperature (F) : 39.3  
 Max Ambient Temperature (F) : 64.0  
 Total Solar Insolation (F) : 1603.00  
 Ambient Pressure (psia) : 14.70  
 Ambient Temperature (F) : 70.0

\*\*\*\*\*  
 \* Calculation Results \*  
 \*\*\*\*\*

-- Emission Summary -----

	Uncontrolled
	ton
Total HAPs	0.2320
Total HC	1.4060
VOCs, C2+	1.0960
VOCs, C3+	0.9550
CO2	0.0120
CH4	0.3100

Uncontrolled Recovery Information:

Vapor (mscfd) :	0.0836
HC Vapor (mscfd) :	0.0808
CO2 (mscfd) :	0.0000
CH4 (mscfd) :	0.0400
GOR (SCF/STB) :	14.1729

-- Emission Composition -----

NoComponent	Uncontrolled
	ton
1 H2S	0.0000
2 O2	0.0000
3 CO2	0.0120
4 N2	0.0310
5 C1	0.3100
6 C2	0.1410
7 C3	0.2250
8 i-C4	0.0600
9 n-C4	0.1240
10 i-C5	0.0570
11 n-C5	0.0610
12 C6	0.1840
13 Benzene	0.0020
14 Toluene	0.0030
15 E-Benzene	0.0000
16 Xylenes	0.0020
17 n-C6	0.2240
18 2,2,4-Trimethylp	0.0010
19 Pseudo Comp1	0.0120
20 Pseudo Comp2	0.0000
21 Pseudo Comp3	0.0000
22 Pseudo Comp4	0.0000
23 Pseudo Comp5	0.0000
24 Total	1.4490

-- Stream Data -----

NoComponent	MW	LP Oil	Flash Oil	Sales Oil	Flash Gas	W&S Gas	Total Emission
	lb/lbmol	mole %	mole %	mole %	mole %	mole %	mole %
1 H2S	34.08	0.0018	0.0013	0.0001	0.0235	0.0099	0.0208
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3 CO2	44.01	0.0295	0.0103	0.0000	0.8338	0.0001	0.6686
4 N2	28.01	0.0832	0.0038	0.0000	3.4099	0.0001	2.7340
5 C1	16.04	1.6770	0.2873	0.0000	59.9096	0.0001	48.0345
6 C2	30.07	0.7863	0.4589	0.0000	14.5069	0.0001	11.6314
7 C3	44.10	1.5828	1.3521	0.4201	11.2499	18.5367	12.6943
8 i-C4	58.12	0.5166	0.4898	0.2840	1.6401	6.2594	2.5557

9 n-C4	58.12	1.3831	1.3454	0.9147	2.9641	14.7499	5.3002
10 i-C5	72.15	0.9920	0.9956	0.8502	0.8415	6.4083	1.9449
11 n-C5	72.15	1.3411	1.3531	1.2043	0.8379	7.1879	2.0966
12 C6	84.00	8.9882	9.1620	8.9831	1.7037	20.6013	5.4495
13 Benzene	78.11	0.1667	0.1701	0.1696	0.0226	0.2849	0.0746
14 Toluene	92.14	0.4436	0.4538	0.4653	0.0165	0.2781	0.0684
15 E-Benzene	106.17	0.1345	0.1377	0.1425	0.0016	0.0348	0.0082
16 Xylenes	106.17	0.8724	0.8930	0.9248	0.0092	0.2029	0.0476
17 n-C6	86.18	10.7322	10.9405	10.7327	2.0035	24.4034	6.4436
18 224Trimethylp	114.23	0.0756	0.0773	0.0785	0.0052	0.0760	0.0192
19 Pseudo Comp1	147.45	31.1615	31.9047	33.2054	0.0205	0.9648	0.2076
20 Pseudo Comp2	259.55	15.5311	15.9017	16.5628	0.0000	0.0014	0.0003
21 Pseudo Comp3	361.36	10.4094	10.6578	11.1008	0.0000	0.0000	0.0000
22 Pseudo Comp4	495.20	7.7625	7.9477	8.2781	0.0000	0.0000	0.0000
23 Pseudo Comp5	749.15	5.3289	5.4561	5.6829	0.0000	0.0000	0.0000
		LP Oil	Flash Oil	Sales Oil	Flash Gas	W&S Gas	Total Emission
MW (lb/lbmol):		224.76	229.47	235.61	27.39	70.78	35.99
Stream Mole Ratio:		1.0000	0.9767	0.9709	0.0233	0.0058	0.0291
Stream Weight Ratio:		224.76	224.12	228.76	0.64	0.41	1.05
Total Emission (ton):					0.884	0.565	1.449
Heating Value (BTU/scf):					1529.06	3774.14	1974.08
Gas Gravity (Gas/Air):					0.95	2.44	1.24
Bubble Pt. @100F (psia):	80.57	18.40	2.89				
RVP @100F (psia):	93.14	43.68	17.75				
Spec. Gravity @100F:	0.94	0.94	0.94				

\*\*\*\*\*

\* Project Setup Information \*

\*\*\*\*\*

Project File : G:\My Drive\Green Mountain Consulting Ltd\Production\Finley -102618 - New Drill PBRs\Tribal  
 Flowsheet Selection : Oil Tank with Separator  
 Calculation Method : AP42  
 Control Efficiency : 0.00%  
 Known Separator Stream : Low Pressure Oil  
 Entering Air Composition : No  
 Component Group : C10+

Well ID : FD Federal 9-23-6-19 - PW Tank  
 Date : 2019.04.25

\*\*\*\*\*

\* Data Input \*

\*\*\*\*\*

Separator Pressure (psia) : 44.70  
 Separator Temperature (F) : 160.0  
 C10+ SG : 0.91  
 C10+ MW(lb/lbmol) : 318.00

-- Low Pressure Oil -----

No.	Component	Mole%	Wt%
1	H2S	0.0018	0.0003
2	O2	0.0000	0.0000
3	CO2	0.0295	0.0058
4	N2	0.0832	0.0103
5	C1	1.6770	0.1192
6	C2	0.7863	0.1048
7	C3	1.5828	0.3094
8	i-C4	0.5166	0.1331
9	n-C4	1.3831	0.3563
10	i-C5	0.9920	0.3173
11	n-C5	1.3411	0.4289
12	C6	8.9882	3.4328
13	C7	2.7184	1.2074
14	C8	3.9900	2.0203
15	C9	3.3123	1.8835
16	C10+	60.1727	84.8197
17	Benzene	0.1667	0.0577
18	Toluene	0.4436	0.1812
19	E-Benzene	0.1345	0.0633
20	Xylenes	0.8724	0.4106
21	n-C6	10.7322	4.0998
22	224Trimethylp	0.0756	0.0383

-- Sales Oil -----

Production Rate (bbl/day) : 6.50  
 Days of Annual Operation : 365  
 API Gravity : 30.50  
 Reid Vapor Pressure (psia) : 3.50  
 Bulk Temperature : 150.0

-- Tank and Shell Data -----

Diameter (ft) : 15.50  
 Shell Height (ft) : 16.00  
 Cone Roof Slope : 0.06  
 Average Liquid Height (ft) : 15.00  
 Vent Pressure Range (psia) : 0.06  
 Solar Absorbance : 0.54

-- Meteorological Data -----

City : Salt Lake City, UT

Min Ambient Temperature (F) : 39.3  
 Max Ambient Temperature (F) : 64.0  
 Total Solar Insolation (F) : 1603.00  
 Ambient Pressure (psia) : 14.70  
 Ambient Temperature (F) : 70.0

\*\*\*\*\*  
 \* Calculation Results \*  
 \*\*\*\*\*

-- Emission Summary -----

	Uncontrolled
	ton
Total HAPs	0.2500
Total HC	1.5420
VOCs, C2+	1.2000
VOCs, C3+	1.0430
CO2	0.0130
CH4	0.3420

Uncontrolled Recovery Information:

Vapor (mscfd) :	0.0921
HC Vapor (mscfd) :	0.0890
CO2 (mscfd) :	0.0000
CH4 (mscfd) :	0.0400
GOR (SCF/STB) :	14.1738

-- Emission Composition -----

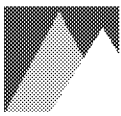
NoComponent	Uncontrolled
	ton
1 H2S	0.0000
2 O2	0.0000
3 CO2	0.0130
4 N2	0.0340
5 C1	0.3420
6 C2	0.1570
7 C3	0.2520
8 i-C4	0.0660
9 n-C4	0.1360
10 i-C5	0.0610
11 n-C5	0.0660
12 C6	0.1990
13 Benzene	0.0030
14 Toluene	0.0030
15 E-Benzene	0.0000
16 Xylenes	0.0020
17 n-C6	0.2410
18 2,2,4-Trimethylp	0.0010
19 Pseudo Comp1	0.0130
20 Pseudo Comp2	0.0000
21 Pseudo Comp3	0.0000
22 Pseudo Comp4	0.0000
23 Pseudo Comp5	0.0000
24 Total	1.5890

-- Stream Data -----

NoComponent	MW lb/lbmol	LP Oil mole %	Flash Oil mole %	Sales Oil mole %	Flash Gas mole %	W&S Gas mole %	Total Emission mole %
1 H2S	34.08	0.0018	0.0013	0.0001	0.0235	0.0113	0.0211
2 O2	32.00	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
3 CO2	44.01	0.0295	0.0103	0.0000	0.8338	0.0001	0.6691
4 N2	28.01	0.0832	0.0038	0.0000	3.4099	0.0001	2.7363
5 C1	16.04	1.6770	0.2873	0.0000	59.9096	0.0001	48.0744
6 C2	30.07	0.7863	0.4589	0.0057	14.5069	0.6317	11.7659
7 C3	44.10	1.5828	1.3521	0.4433	11.2499	19.3888	12.8578
8 i-C4	58.12	0.5166	0.4898	0.2917	1.6401	6.3051	2.5617

9 n-C4	58.12	1.3831	1.3454	0.9327	2.9641	14.7121	5.2849
10 i-C5	72.15	0.9920	0.9956	0.8576	0.8415	6.2981	1.9194
11 n-C5	72.15	1.3411	1.3531	1.2125	0.8379	7.0448	2.0641
12 C6	84.00	8.9882	9.1620	8.9991	1.7037	20.0594	5.3299
13 Benzene	78.11	0.1667	0.1701	0.1697	0.0226	0.2771	0.0729
14 Toluene	92.14	0.4436	0.4538	0.4650	0.0165	0.2700	0.0666
15 E-Benzene	106.17	0.1345	0.1377	0.1423	0.0016	0.0337	0.0080
16 Xylenes	106.17	0.8724	0.8930	0.9237	0.0092	0.1968	0.0463
17 n-C6	86.18	10.7322	10.9405	10.7515	2.0035	23.7597	6.3014
18 224Trimethylp	114.23	0.0756	0.0773	0.0785	0.0052	0.0738	0.0187
19 Pseudo Comp1	147.45	31.1615	31.9047	33.1602	0.0205	0.9359	0.2013
20 Pseudo Comp2	259.55	15.5311	15.9017	16.5395	0.0000	0.0014	0.0003
21 Pseudo Comp3	361.36	10.4094	10.6578	11.0853	0.0000	0.0000	0.0000
22 Pseudo Comp4	495.20	7.7625	7.9477	8.2665	0.0000	0.0000	0.0000
23 Pseudo Comp5	749.15	5.3289	5.4561	5.6749	0.0000	0.0000	0.0000
		LP Oil	Flash Oil	Sales Oil	Flash Gas	W&S Gas	Total Emission
MW (lb/lbmol):		224.76	229.47	235.37	27.39	70.09	35.82
Stream Mole Ratio:		1.0000	0.9767	0.9710	0.0233	0.0057	0.0290
Stream Weight Ratio:		224.76	224.12	228.53	0.64	0.40	1.04
Total Emission (ton):					0.975	0.614	1.589
Heating Value (BTU/scf):					1529.06	3741.81	1966.19
Gas Gravity (Gas/Air):					0.95	2.42	1.24
Bubble Pt. @100F (psia):	80.57	18.40	2.98				
RVP @100F (psia):	93.14	43.68	18.28				
Spec. Gravity @100F:	0.94	0.94	0.94				

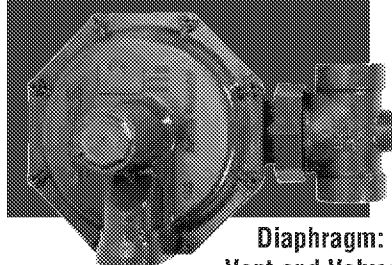




## Attachment 3: Pneumatic Device and Pump Specifications

# Model 143-80 Service Regulator

## Technical Data



**Models:**  
143-80-1  
143-80-2  
143-80-2HP

**Valve Body:** Cast Iron, 125 psig Working Pressure

**Spring and Lower Case:** Die-Cast Aluminum

**Orifice:** Stainless Steel

**Fulcrum Pin:** Aluminum or Brass

**Valve Seat/Stem:** One piece molded  
Buna-N seat pad and fiberglass reinforced nylon stem

**Throat/Support/Stem Guide:** Cast Aluminum  
integral to lower case

**Diaphragm Plate:** Plated Steel

**Straight Body**

3/4" x 3/4"

3/4" x 1"

3/4" x 1-1/4"

1" x 1"

1" x 1-1/4"

1-1/4" x 1-1/4"

**Diaphragm:** Nylon fabric reinforced Buna-N with full 26 in<sup>2</sup> effective area

**Vent and Valve:** Precision-fit polyethylene valve and seat, threaded 3/4" or 1" NPT

**Operating Temperature:** -20° F to 150° F (-28.9° C to 65.5° C)

**Corrosion Protection:** Cases dip primed chromate conversion coating, topcoat enamel

**Internal Relief Valve:** Set to relieve at approximately 7" w.c. above normal outlet pressure setting

### Spring Ranges

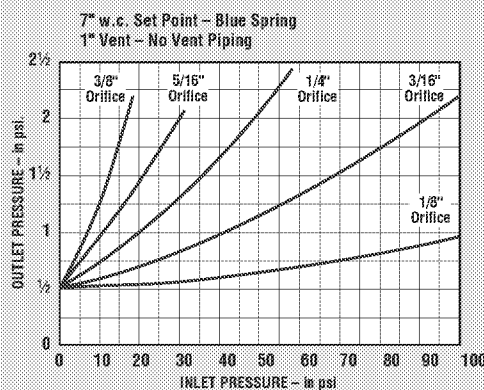
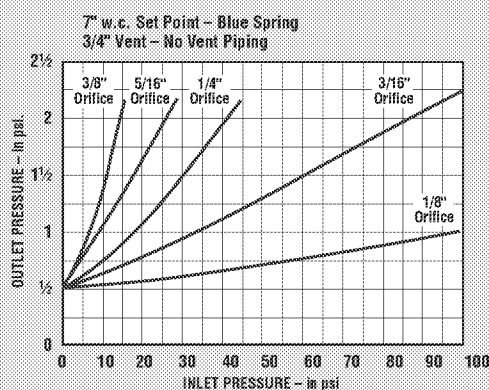
Outlet Pressure Ranges	Spring Color	Spring Part Number
3 1/2" to 6 1/2" w.c.	Red	143-62-021-15
5" to 8 1/2" w.c.	Blue	143-62-021-16
6" to 14" w.c.	Green	143-62-021-17
12" to 28" w.c.	Orange	143-62-021-18
1/2 psi to 2 psi	Black & White	143-62-021-22
1/2 psi to 3 psi	Cadmium*	173-62-021-02
2 to 6 psi	Black*	139-16-021-01

\*For high pressure model 143-80-2HP

### Orifice and Maximum Inlet Pressure

Orifice	Part Number	Pressure
1/8" aluminum	143-62-023-37	125 psig
3/16" aluminum	143-63-023-40	125 psig
1/4" aluminum	143-62-023-42	60 psig
5/16" aluminum	143-62-023-43	40 psig
3/8" aluminum	143-62-023-44	40 psig
1/2" aluminum	143-62-023-45	20 psig
5/8" aluminum	143-62-023-46	10 psig

### Relief Valve Performance: Lever blocked with valve disc in the wide open position



### Maximum Emergency Pressure

The maximum pressure that the model 143-80-1, 143-80-2 and 143-80-2HP regulator inlets may be subjected under abnormal conditions without causing damage to the regulator is the stated Maximum Inlet Pressure + 50 psi

**Note:** For the Low Pressure Cut Off version model 143-80-6 it is Maximum Inlet Pressure + 10 psi. See bulletin TD-1301-L

The maximum pressure to which the 143-80 diaphragm case may be subjected under abnormal conditions without causing damage to the internal parts of the regulator is the set point + 3 psi.

If the outlet pressure exceeds this pressure, the regulator must be removed from service and carefully inspected. Damaged or otherwise unsatisfactory parts must be replaced before returning the regulator to service. The maximum outlet pressure that can be safely contained in the 143-80 diaphragm case is 10 psi (safely means no leakage as well as no bursting).

### Full Open Capacity

Use the following formula for the full open capacity:

$$1. Q = K \sqrt{P_0(P_1 - P_0)} \dots \text{(for } \frac{P_1}{P_0} \text{ less than 1.894)}$$

$$2. Q = \frac{KP_1}{2} \dots \text{(for } \frac{P_1}{P_0} \text{ greater than 1.894)}$$

Q = maximum capacity of the regulator  
(in SCFH of 0.6 specific gravity natural gas).

K = the "K" factor, the regulator constant from the table below.

P<sub>1</sub> = absolute inlet pressure (psia).

P<sub>0</sub> = absolute outlet pressure (psia).

Orifice	5/8"	1/2"	3/8"	5/16"	1/4"	3/16"	1/8"
K	820	520	292	206	132	74	33



## Capacities

Flow capacities in SCFH natural gas  
(0.6 specific gravity – 14.65 psia – 60°F)

Capacities are based on the following maximum variations in outlet pressure:

Red and Blue Springs – 1" w.c. droop

Orange Spring – 3" w.c. droop

Green Spring – 2" w.c. droop

Black Spring – 10% droop

**Note:** The 1/2 psig, 1 psig and 2 psig inlet pressures apply only to Red and Blue springs.

**Note:** The last capacity figure in each column indicates the maximum capacity for each orifice at recommended pressure within the optimum performance range.

The performance data is based on normal testing at 70°F flowing temperature.

Changes in performance can occur at extreme low flowing temperatures.

## Other Gases

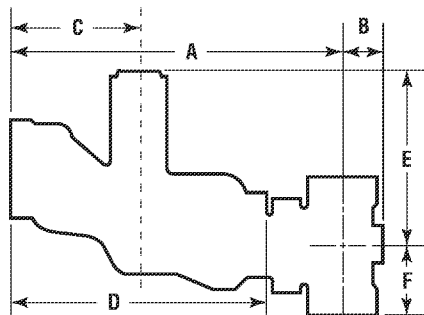
143-80 Regulators are mainly used on natural gas. However, they perform equally well on LP gas, nitrogen, dry CO<sub>2</sub>, air and others.

Other Gases	Correction Factor
Air (Specific Gravity 1.0)	0.77
Propane (Specific Gravity 1.53)	0.63
1350 BTU Propane Air Mix (1.20)	0.71
Nitrogen (Specific Gravity 0.97)	0.79
Dry Carbon Dioxide (Specific Gravity 1.52)	0.63

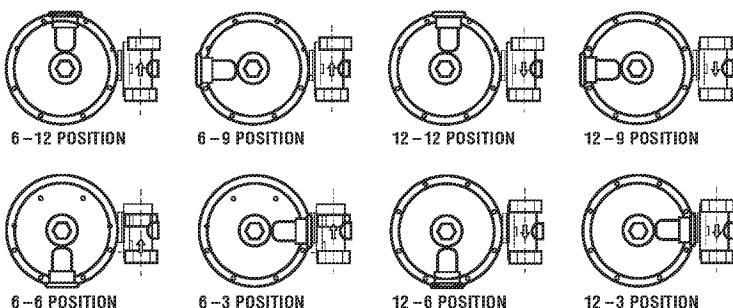
For other non corrosive gases:  $\text{CORRECTION FACTOR} = \sqrt{\frac{0.6}{\text{Specific Gravity of the Gas}}}$

## Dimensions

Regulator	A	B	C	D	E	F
143-80	9 3/8"	1 1/16"	3 7/16"	6 7/8"	5 3/4"	1 3/32"



## Mounting Positions



## Body Size 3/4" x 3/4"

Inlet	Orifice						
psig	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
1/2	—	—	—	—	340	450	510
1	—	—	—	480	500	510	530
2	—	—	530	560	570	580	600
3	—	420	600	620	630	650	670
5	250	560	700	720	730	770	790
7.5	310	700	840	860	880	900	900
10	370	830	950	970	1000	1020	1020
20	530	1200	1220	1240	1250	1270	—
40	860	1570	1330	1340	1450	—	—
60	1200	1660	1520	—	—	—	—
80	1500	1710	—	—	—	—	—
125	1800	1900	—	—	—	—	—

## Body Size 3/4" x 1" • 1" x 1"

Inlet	Orifice						
psig	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
1/2	—	—	—	—	350	460	520
1	—	—	—	480	550	600	650
2	—	—	530	700	840	880	780
3	—	420	650	870	1000	920	810
5	250	580	890	1120	1160	950	970
7.5	310	700	1140	1340	1270	1140	1060
10	370	840	1360	1500	1330	1200	1180
20	530	1230	2000	1600	1480	1400	—
40	860	1700	2000	1640	1900	—	—
60	1200	1900	2000	—	—	—	—
80	1540	2000	—	—	—	—	—
125	2100	2100	—	—	—	—	—

## Body Size 3/4" x 1-1/4" • 1" x 1-1/4" • 1-1/4" x 1-1/4"

Inlet	Orifice						
psig	1/8"	3/16"	1/4"	5/16"	3/8"	1/2"	5/8"
1/2	—	—	—	—	350	460	520
1	—	—	—	480	550	680	760
2	—	—	530	700	840	1020	1030
3	—	420	650	870	1030	1200	1050
5	250	580	890	1180	1350	1490	1060
7.5	310	700	1140	1500	1610	1580	1060
10	370	840	1360	1700	1710	1800	1180
20	630	1230	1600	1800	1900	1900	—
40	860	1800	2200	1900	2000	—	—
60	1200	2100	2400	—	—	—	—
80	1550	2200	—	—	—	—	—
125	2250	2400	—	—	—	—	—



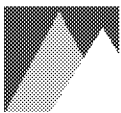
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## Attachment 4: Engine Specifications

# A-90

# GENSET



## GENSET RATINGS

### A-90 GENSET RATINGS

**kW**

Standby Power	1800 rpm	83
	1500 rpm	61
Prime Power	1800 rpm	75
	1500 rpm	68

Note: kW rated with 9.0:1 compression ratio 1000 BTU Fuel



## FEATURES

- Engine, generator, and radiator, are mounted and aligned on a channel steel base suitable for lifting.
- Standard front mount radiator with pusher fan. For other options and details consult Arrow Engine.
- Control Panel: generator mounted. NEMA 1 for general indoor use. 3.5" panel type 2% accuracy, voltmeter, ammeter, frequency meter, hourmeter and combination voltmeter/ammeter switch. Engine instruments and controls rear mounted for easy accessibility.
- Generator: direct connected, fan cooled, A.C. revolving field type, single bearing generator, with brushless exciter and damper windings. Twelve lead broad range voltage, reconnectable, 60HZ/50HZ. Insulation material Nema class H to F temperature rise within Nema (105°C) for prime power duty, within Nema (130°C) for continuous standby duty. All generators are rated at 0.8 power factor, are mounted on the engine flywheel housing and have multiple steel disc flexible coupling drive.

## APPLICATIONS

- Prime power for facilities
- Backup power
- Emergency power
- Electricity for remote locations
- Compressor power
- Irrigation power
- Hydraulics power

A90GS-ML-F-JAN15

**Arrow Engine Company**  
2301 East Independence, Tulsa, Oklahoma 74110

[www.ArrowEngine.com](http://www.ArrowEngine.com)

toll free (800) 331-3662 local (918) 583-5711  
local fax (918) 388-3202

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# A-90

# GENSET



## TECHNICAL SPECIFICATIONS

Configuration	4-stroke	6-cylinder (inline)
Bore x Stroke	118 x 135 mm	4.65 x 5.32 in
Engine Displacement	537 cubic in	8.8 L
Compression Ratio	9.0:1	
Complete Generator Dry Weight (with Radiator)	3750 lbs	
Firing Order	1-5-3-6-2-4	
Natural Gas Fuel Pressure Requirements	6-8 inches of H <sub>2</sub> O	
Rotation	Counter clockwise (facing the flywheel)	
Aspiration	NA (Naturally Aspirated)	
Air Filter	Dry	
Battery Charging System	12V	63 amp
Rated Power Max Output with Fan at 1800 rpm	125 BHP	
Continuous Power Rating with Fan at 1800 rpm	109 BHP	
Governor Type	Electric 3% regulation standard	
Flywheel Housing Size	SAE 1	
Oil Change Capacity with Filters	22 quarts	
Coolant Capacity with Radiator	13.5 gallons	50/50 coolant mix
Emissions	Certifiable with AFR control system and catalyst option	
Removable Wet Liners		
Oil Cooler		
Liquid Cooled Exhaust Manifold		
Oil Cooled Pistons		
Optional AFR Controls		
Radiator and Fan Standard		

